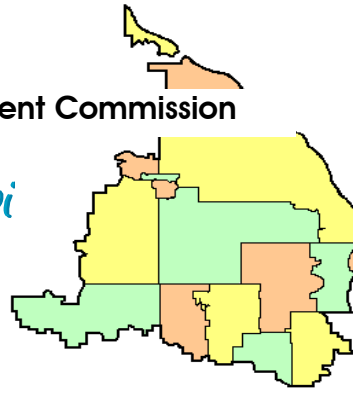


A meeting of the joint Technical Advisory Committee (TAC) of the Shingle Creek and West Mississippi Watershed Management Commissions is scheduled for 8:30 a.m., Thursday, November 30, 2017, at Crystal City Hall, 4141 Douglas Drive North, Crystal, MN.

A G E N D A

Meeting docs (*) are posted on the website at
<http://www.shinglecreek.org/tac-meetings.html>

1. Approve agenda.*
2. Approve Minutes of October 26, 2017 meeting.*
3. FEMA/DNR Proposal.
4. Twin Lake Carp Project.
5. Biochar Project International Erosion Control Association Conference Presentation.
6. Local Water Management Plan Updates.
7. Other business.
8. Next meeting _____



MINUTES
October 26, 2017

A meeting of the Technical Advisory Committee (TAC) of the Shingle Creek and West Mississippi Watershed Management Commissions was called to order by Chairman Richard McCoy at 8:31 a.m., Thursday, October 26, 2017, at Crystal City Hall, 4141 Douglas Drive North, Crystal, MN.

Present were: Andrew Hogg, Brooklyn Center; David Fritzke, Crystal; Liz Stout, Minneapolis; Ben Scharenbroich, Plymouth; Richard McCoy and Marta Roser, Robbinsdale; Ed Matthiesen, Erik Megow and Bryce Cruey, Wenck Associates, Inc.; and Judie Anderson, JASS.

Not represented: Brooklyn Park, Champlin, Maple Grove, New Hope and Osseo.

Also present: Pat Lynch and Rita Weaver, Minnesota Department of Natural Resources (MnDNR).

I. Motion by Hogg, second by Stout to approve the **agenda** with the addition of item IV.A. Request from Hennepin County. *Motion carried unanimously.*

II. Motion by Stout, second by Hogg to approve the **minutes of the August 24, 2017 meeting.*** *Motion carried unanimously.*

III. SCWM FEMA Updates.

A. The Federal Emergency Management Agency (FEMA) has awarded the MnDNR a **grant to update the Special Flood Hazard Areas (SFHAs) in the Twin Cities HUC8 watershed.** The scope of the grant depends on individual river reaches, but in most cases includes

1. Updated hydrology, either through modeling or use of statistical methods
2. Updated river hydraulics and/or volume analyses
3. Creating the floodway and floodplain shapefiles and x-section shapefiles
4. Creating depth grids
5. Development of Work Maps
6. A project narrative describing the above activities

B. Pass-through grants can be provided so that watershed organizations can complete some or all of these tasks. FEMA would like to leverage existing data wherever possible so Twin Cities WMOs within the HUC8 watershed are being approached to see if they have any data that can support this effort. Since leveraged data will reduce overall project cost, WMOs that can provide data will be offered remaining funds allotted for that watershed to be used for such activities as flood risk reduction or communication activities.

C. A map* of the FEMA Study Areas in the SCWM hydrologic boundary was distributed. It shows which reaches should be studied using approximate or detailed methods.

D. Work can begin as soon as the pass-through grant paperwork with the state is completed. All deliverables must be submitted to the MnDNR by April 2020. The Scoping Document* outlines a suggested intermediate timeline.

E. Total funds for each HUC10 watershed have been established between FEMA and the DNR. The cost estimates are based on MnDNR staff developing new hydrologic and hydraulic models using HEC-HMS and HEC-RAS, delineating all floodplains and x-section shapefiles, and developing the depth grids. These cost estimates will not be provided to the WMOs and the amount of the grant will not exceed the FEMA-negotiated costs for each WMO. Any unused funds can be passed through to the WMO to complete other flood risk reduction activities. These activities must be pre-approved by MnDNR staff.

F. Wenck staff will put together a scope of work and cost estimate for consideration by the Commissions at their November meeting.

IV. Other Business.

A. Request from Hennepin County. Karen Galles, Hennepin County Environment and Energy, Land and Water Unit Supervisor, has asked the Commissions if Hennepin County could apply for funds through the Commission's cost share grant program to purchase salt scale weighing equipment to be used at their Osseo garage. The grant request is estimated to be between \$5,000 and \$10,000. The members voted 0-5 against allowing Hennepin County to participate in this grant program, noting that the program is meant to be used by members of the JPO and the County is not a party to the JPA.

B. The **next meeting** of the Technical Advisory Committee is scheduled for November 30, 2017, at 8:30 a.m. at Crystal City Hall. The topic of discussion will be the Twin Lake project.

C. The meeting was adjourned at 9:07 a.m.

Respectfully submitted,



Judie A. Anderson
Recording Secretary

Technical Memo



To: Ed Mathisen, Wenck Associates, Inc.
Diane Spector, Wenck Associates, Inc.
Jeff Strom, Wenck Associates, Inc.

From: Tom Langer, Wenck Associates, Inc.

Date: November 24th 2017

Subject: Meeting with MnDNR Summary

The purpose of this technical memorandum is to summarize the discussion and conclusions from our meeting with Daryl Ellison (MN DNR fisheries) and phone call with Keegan Lund (MN DNR AIS Specialist). Jason Spiegel (MN DNR hydrologist) was unable to attend the meeting. The invited persons are experts in their respective areas and assist with various permits (i.e. fish collection, barriers/ structures, aerators, aquatic vegetation management) required during this project. The primary objective of this meeting was to discuss and determine the best management strategy to remove carp from the system, limit recruitment post removals and develop submerged aquatic vegetation (SAV) response options. Below is a summary.

Fisheries Discussion

- 1) MnDNR had no objection to the population and density modeling assessment.
- 2) MnDNR agreed that common carp could move from Shingle Creek into the Twin/Ryan lakes. However, they believe that carp are more likely having strong periodic internal recruitment from Upper Twin and Ryan Lakes. Recruitment is believed to occur post severe winterkill within the system. The winterkills are not believed to completely wipe out all individuals, therefore, remaining carp within the system are able to migrate into and spawn in Upper Twin and/or Ryan Lakes where no egg predators exist due to the winterkill. Upper and Ryan Lakes are believed to be the most prone to severe winterkills. Winter aeration of Ryan and Upper Twin Lakes was recommended to prevent winterkill from occurring. See *comment #5*.
- 3) The stormwater basin on the north side of Upper Twin Lake was believed to be a potential recruitment area (Figure 1). The MnDNR supported this idea based on evidence that carp moved into the basin during high flow conditions. Implementation of a fish barrier to prevent seasonal migration of carp into the basin was proposed and agreed with by MnDNR.

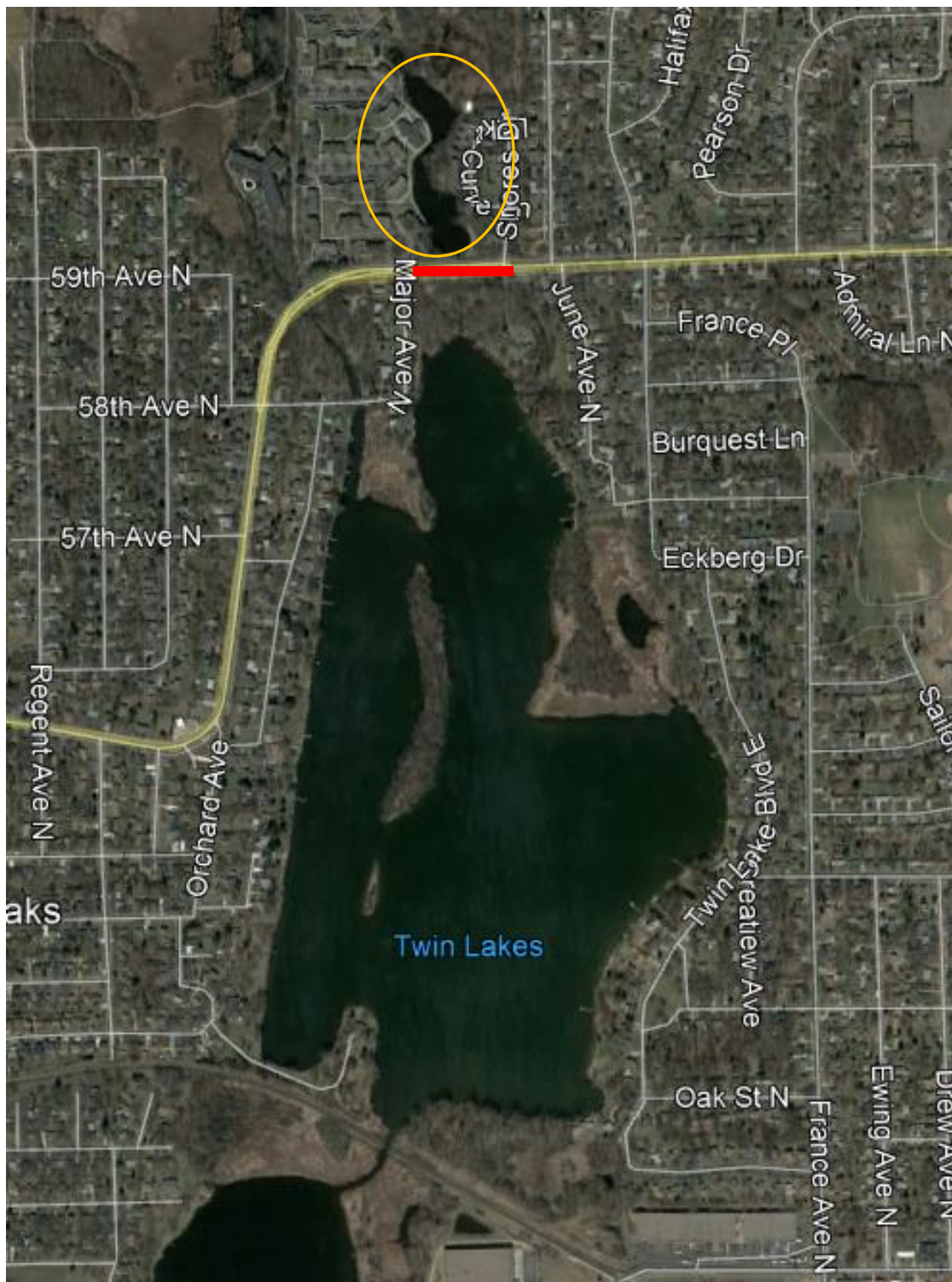


Figure 1. Location of proposed barrier (red line) to prevent movement into the stormwater pond north of Bass Lake Road (orange circle).

4) Shingle Creek/ Palmer Lake could serve as a potential source of carp into the Twin and Ryan Lake systems. Implementation of a fish barrier (temporary or permanent) at the Osseo Road culvert to prevent seasonal migration of carp into Ryan Lake from Shingle Creek was proposed and agreed with by MnDNR. See comment #5.



Figure 2. Location of barrier can occur anywhere along Ryan Lake outlet creek (light blue line) to prevent movement of carp into Ryan lake from Shingle Creek.

5) An alternative scenario was discussed in which a barrier would be installed at the France Avenue bridge between Lower Twin and Ryan Lakes. This scenario would prevent/limit the movement of carp between Ryan Lake and the Twin Lake Chain and remove the need to aerate Ryan Lake. MnDNR was initially concerned with preventing movement of other fish species between Lower Twin and Ryan Lake, however, after further discussion of the condition of Ryan Creek, few species were believed to migrate between the basin.

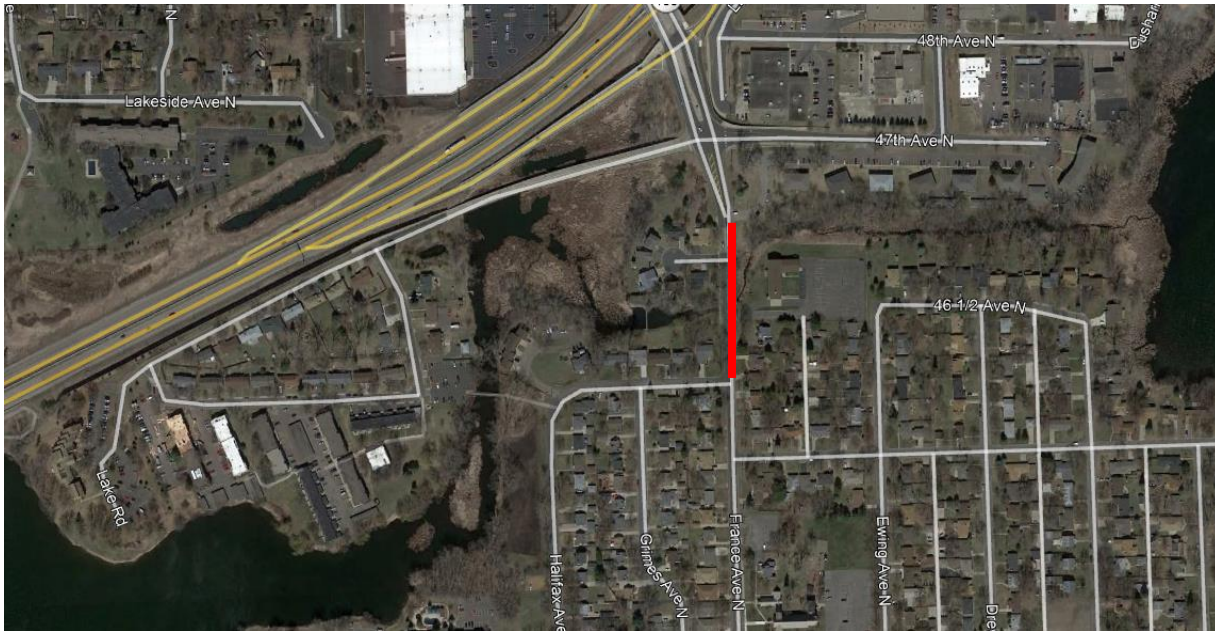


Figure 3. Location of proposed barrier (red line) to prevent movement into the Twin Lake chain of lakes from Ryan Lake and Shingle Creek.

6) Winter seining was believed to be an effective method at reducing the carp population and the best method of initial population reduction. Review of monthly tracking demonstrated tight schooling of carp in Middle Twin and Upper Twin during the month of January. Tracking should occur frequently leading into winter seining to locate where carp are at the time of seine events. Brad Westerberg is to be contacted as the Hennepin County commercial fisherman to conduct seining.

7) Baited box nets were also suggested as means to remove carp within the system. Box netting does not require commercial fisherman license and would allow targeting carp in shallow areas during the open water season. This was discussed as means for a more routine management approach to carp removals that could be conducted (if needed) once initial populations of carp have been reduced through winter seining.

8) Targeted removals along Ryan Creek at the France Avenue bridge and in Ryan Creek wetland were also discussed. The Ryan Creek may act as a natural choke point. Blocking movement beyond the weir, fisherman could move from Lower Twin lake up the channel corralling carp. The whoosh system was also discussed as a means of carp removal but would require further investigation and planning.

In summary, internal recruitment is believed to occur within the system post winterkill years. Shingle Creek could serve as a potential source of carp into the system on an annual basis and post severe winterkill due to loss of egg predator species. A combination of barriers and aeration systems are recommended to prevent carp recruitment within the system. Winter seining is anticipated to be very successful at reducing carp within the system. Secondary removals along Ryan Creek provides an alternative approach to manage the carp population or if commercial fisherman are not available for winter seining or if initial winter seining does not remove the desired biomass.

Submerged Aquatic Vegetation (SAV) Discussion

- 1) SAV will respond favorably to improved water quality conditions. It will be difficult to predict which species will flourish and how dense species will be. However, higher SAV coverage and densities should be anticipated which could make boating/navigation more difficult within the Upper basin.
- 2) The presence of curlyleaf pondweed (CLP) is a significant concern as it is an AIS that grows early in the year and prevents native species from establishing. Keegan Lund is very familiar with the Twin Lakes basin and is open to a variance application for management of CLP within the basin. This variance would allow delineation and treatment of CLP across the entire basin for multiple years to ensure CLP doesn't dominate the basin.
- 3) Native SAV species are also anticipated to increase in diversity and abundance. Management of native species is much more restricted and likely held to defined management conditions.

Next Steps

- Determine whether Ryan Lake will be included in the carp management actions. If yes, then aeration should occur on Ryan Lake in addition to Upper Twin. A barrier will be installed at the outlet of Ryan Lake at the Osseo Road culvert to prevent movement of fish into Ryan Lake from Shingle Creek. If no, then Ryan Lake will not be aerated and the fish barrier will be placed on the France Ave bridge. This will be determined by a review of project budget for design and construction costs and the cities/commission willingness to operate and fund annual aeration and barrier maintenance related tasks.
- Contact commercial fisherman and schedule tentative winter seine removals. Establish terms and compensation of removals. Determine needed assistance and volunteers.
- Determine whether aeration will be pursued and who will operate and pay for electric, maintenance, and other operating costs/labor.
- Finalize location and design of barrier(s).
- Apply for aeration permits through Ecology and Water Resources division of MnDNR (if applicable).
- Apply for permanent barrier permits through Ecology and Water Resources division of MnDNR (if applicable). Any temporary barriers are permitted through the Fisheries division (if applicable).
- Discuss and review SAV management options. If treatment is pursued, who will fund? A variance application to go above standard treatment limits need only be pursued if available funds are sufficient to treatment greater acreage. Standard treatment acreage is equal to 15% of the littoral habitat within a lake.
<http://www.dnr.state.mn.us/invasives/variance.html>



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Exceptional outcomes.

November 28, 2017

D R A F T

Rita Weaver

Floodplain Action Hydrologist
MnDNR
500 Lafayette Road N, Box 25
St. Paul, MN 55155-4025

RE: Shingle Creek Model Update

Dear Ms. Weaver:

As you requested, Wenck Associates, Inc. (Wenck) submits this proposal to update the hydrologic and hydraulic models for the Shingle Creek and West Mississippi watershed. This letter proposal includes our understanding of the project, the proposed scope of services, estimated schedule and costs to complete the project.

Project Understanding and Approach

The purpose of this project is to update special flood hazard areas within the Shingle Creek and West Mississippi watersheds. To do this, hydrologic and hydraulic models need to be created/revised in the areas identified in Attachment 1. There are both detailed and non-detailed areas shown in Attachment 1. This scope will provide an estimate for updating each of those areas. The generalized scope is as follows:

- ▲ Update hydrology in EPA-SWMM.
- ▲ Update creek hydraulics using HEC-RAS
- ▲ Create floodway and floodplain shapefiles using HEC-RAS Mapper
- ▲ Create Depth Grids using Arc-GIS
- ▲ Create Work maps showing new SFHA, cross sections and other information
- ▲ Documentation

Scope

Task 1 – Meetings

For this project we anticipate having meetings at critical design steps during the project starting with a kick off meeting, which will set the tasks, schedule and outcomes of the project from the start. A list of anticipated meetings is below.

- ▲ Kickoff meeting – at this meeting Wenck and City staff will discuss the project and project objectives including schedule, key deliverables and the responsible party. We will identify data gaps and next steps.

- ▲ Internal City Meeting – Wenck will meet with the cities to discuss changes observations and known data availability.

Rita Weaver

Floodplain Action Hydrologist
MnDNR
November 28, 2017

- ▲ 60% progress meeting – At this meeting we will have a good idea of what the new flood inundation is, and its associated impacts. This meeting will be held when the 60% draft report has been completed.
- ▲ 90% progress meeting – At this meeting we will present the 90% model results, report and figures for comments.

Deliverables:

- ▲ *Meeting Agendas*

Task 2 – Data Organization

Wenck will meet with the Cities and MWMO at the start of the project to introduce the project team, acquire the data to be provided by the Cities (listed below), and verify the overall scope of the project. Wenck will review GIS data, Drainage System maps, and road crossing as-builts provided by the Cities to determine locations where data may be missing or unclear.

Data provided by City:

- ▲ Drainage Network Geodatabase
- ▲ Drainage System Plats
- ▲ Land use mapping that coincides with City’s Modeling Guidance Manual
- ▲ Road Crossing and Bridge As-built plan sets

Wenck will acquire the following data:

1. USGS Gauge data.
2. LiDAR data from MnDNR *and prepare raster data sets.*
3. Effective Hydraulic Models from FEMA or MnDNR
4. Acquire watershed district models and flood stage data for defining boundary conditions.
5. Review GIS data and Drainage System Plats to determine locations where data may be missing or unclear.

Task 3 – Surveying

A survey is proposed to verify information at each road crossing and/or outlet structure in the detailed study areas shown in Attachment 1. This level of effort will include surveying two cross sections upstream of each road crossing and two cross sections downstream of each cross section as shown in Figure 1 below. From Figure 1, cross sections 1 and 4 will be located such that they are sufficiently upstream of downstream of the contraction and expansion areas accordingly. Cross sections 2 and 3 will be representative of the cross section immediately upstream and downstream of each crossing. This task does not include a comprehensive survey of the detailed study areas. It only includes survey at road crossings.

Specific surveying tasks proposed are:

- ▲ Perform cross section surveys at each crossing in the detailed study areas shown in Attachment 1
- ▲ Verify inverts, measure culvert size, note culvert material, and take photos upstream and downstream at each culvert crossing
- ▲ At bridges, where as-built information can't be provided, survey piers, abutments, deck, soffit, measure opening dimensions, and take photos upstream and downstream of the crossing.
- ▲ Survey all road crowns and road widths.

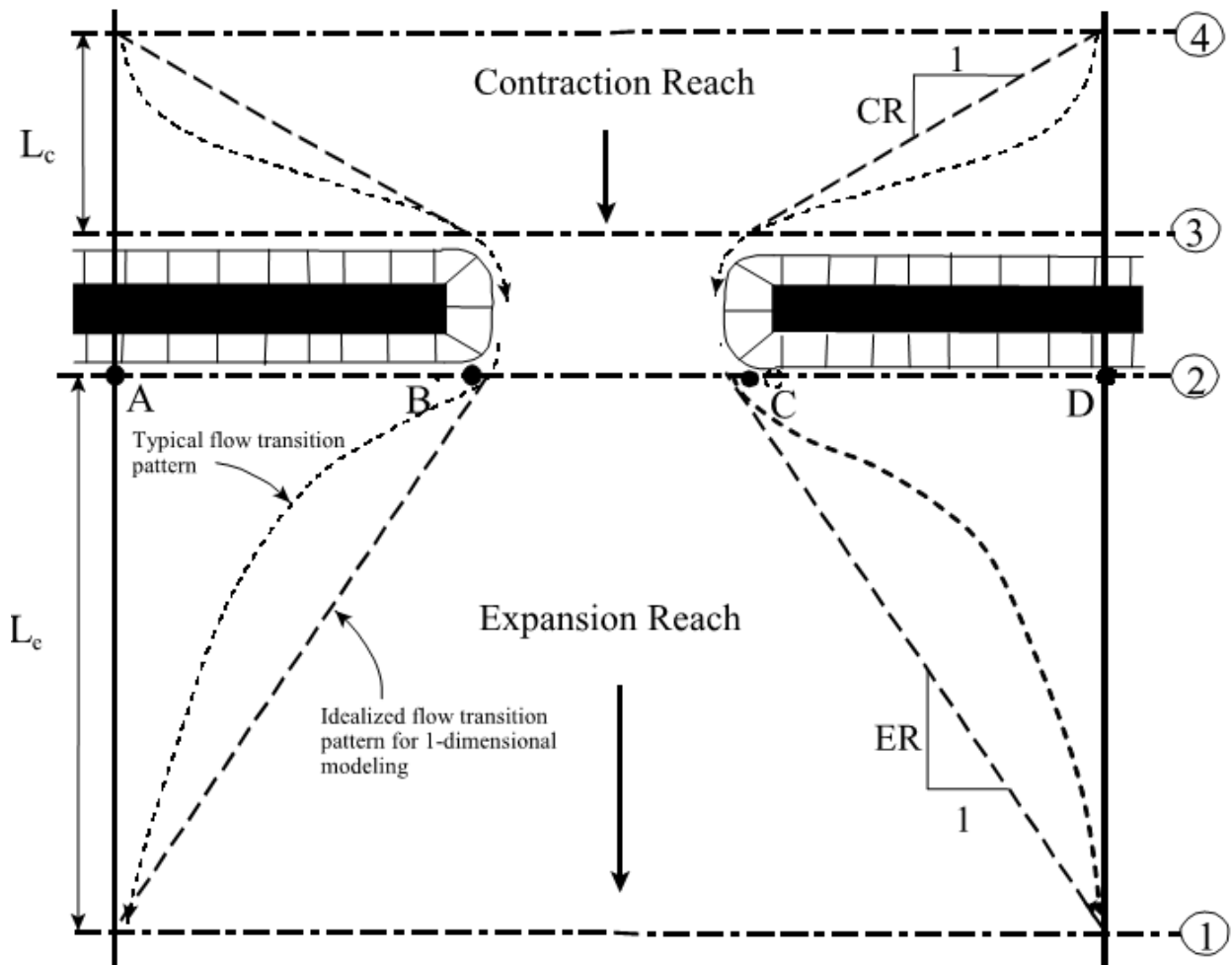


Figure 1. Survey Cross Sections (From HEC-RAS reference manual)

Deliverables:

- ▲ Survey Notes and Datasets

Task 4 – Hydrology Update

Rita Weaver

Floodplain Action Hydrologist
MnDNR
November 28, 2017

For this task Wenck proposes to leverage the existing XP-SWMM model for Shingle Creek as a starting point. The subwatershed delineations will be reviewed for accuracy based on current land use, topography, and storm sewer network information. Wenck proposes to delineate subwatersheds based on the same information above for other detailed and non-detailed study areas that are not covered by the Shingle Creek model.

Infiltration will be accounted for by the Green-Ampt method. Wenck proposes to investigate several rainfall distributions including the MSE3, a nested distribution, and an SCS type II curve to determine the most appropriate curve. One curve will be selected during the validation analysis described below. The most current land use and soils information will be used to determine the infiltration parameters for each subwatershed.

Peak floods will be determined for the 10%, 4%, 2%, 1%, and 0.2% annual chance flood events for both detailed and non-detailed areas. Peak flows will be validated on Shingle Creek at the USGS Gauge 05288705, at Queen Ave.

Wenck will perform an internal QA/QC and write a technical memorandum narrative for the Hydrologic model update. The tech memo and the models will be sent to the Internal Hydrology Review Comity (IAHRC). Time will be budgeted to respond to comments from the IAHRC and make appropriate changes to the model.

Deliverables:

- ▲ *Hydrologic model*
- ▲ *Technical memorandum narrative*
- ▲ *Internal QA/QC documentation*

Task 5 – Hydraulics Update (Detailed Study Areas)

Wenck proposes to use HEC-RAS as the hydraulic model for Shingle Creek and all other creek models. Several areas shown in Attachment 1 include large wetlands, lakes, or storage areas. These areas will be modeled in the XP-SWMM model. Hydraulic models will be run for the 10%, 4%, 2%, 1%, and 0.2% flood events. Specific subtasks associated with the detailed area hydraulic update are, but not limited to:

- ▲ Importing effective models into RAS. This includes using LOMR updated models.
- ▲ Create a duplicate effective model
- ▲ Cut cross sections at every cross section location within the existing detailed study areas using statewide Lidar. The channel geometry used will be the effective model channel geometry.
- ▲ Determination of Manning’s roughness coefficient for the channel and overbank based on current conditions.
- ▲ Enter surveyed bridge information and/or as-built bridge information

A floodway analysis will be performed in all detailed study areas shown in Attachment 1.

Internal QA/QC will be performed and documented as part of this task.

Deliverables:

- ▲ *HEC-RAS Model(s)*
- ▲ *Internal QA/QC documentation*

Task 6 – Hydraulic Update (Non-Detailed Study Areas)

Non-detailed study areas shown in the FEMA Analysis Areas Figure provided by the DNR for the Shingle Creek and West Mississippi Hydrologic Boundary will be modeled in HEC-RAS like the detailed study areas with a few distinct differences. Cross sections will be cut in appropriate locations using statewide LiDAR. No channel information below the LiDAR elevations will be surveyed. Bridge and road crossing information will be entered based on As-built information.

Deliverables:

- ▲ *HEC-RAS Model(s)*
- ▲ *Cross Sections*
- ▲ *Internal QA/QC Documentation*

Task 7 – GIS work and Mapping

GIS work

For detailed study areas, inundation shapefiles will be generated using the RAS-Mapper function in HEC-RAS for the 1%, 0.2% and floodway model runs and imported into an Arc-GIS environment. For non-detailed areas only the 1% annual chance flood event will be mapped using RAS-Mapper.

Once in an Arc-GIS environment, the inundation shapefiles will be QA/QCd for accuracy and consistency with the model results. Documentation of the QA/QC process will be provided.

Once the QA/QC process is finished, data from RAS-Mapper will be imported into the blank shapefiles provided by the MnDNR as a starting point to map the special flood hazard areas.

Work Map

Work maps will be generated showing the 1% annual chance flood inundation in all areas including non-detailed areas. In detailed areas, the 0.2% annual chance flood and the floodway will be shown. Additional information will include the cross section locations, and the stream center line. Work maps will be at a 1ft = 500ft scale. Maps will be internally QA/QCd and documentation of that QA/QC will be provided.

Depth Grid

Depth grids will be generated and QA/QCd for all return intervals in detailed areas and the 1% annual chance flood in non-detailed areas. Documentation of the QA/QC process will be provided.

Deliverables:

- ▲ *Final work map(s); 5 copies to the DNR, Copies to the City and Watershed District.*
- ▲ *Final depth grids for all return intervals*

- ▲ *Final shapefiles for the 1% annual chance flood, 0.2% annual chance flood and the floodway*
- ▲ *Cross section shapefiles*
- ▲ *Internal QA/QC documentation*

Task 8 – Reporting

A summary report documenting the hydrology, hydraulics, and mapping methods and results will be written in three stages as follows:

- ▲ 60% Draft Report – A draft of the report will be completed and circulated to the DNR, Cities, and Watershed District for comments.
- ▲ 90% Draft Report – a 905 Draft Report will incorporate comments from the 60% report, be completed, and circulated to the DNR, Cities, and Watershed District for comments.
- ▲ Final Report – A final report incorporating all comments from the 60% and 905 submittals will be completed.

Budget

The Wenck project team proposes a budget of \$138,116 be allocated to complete the tasks listed above. Wenck will invoice the DNR monthly based on time and materials. Budget without obtaining written approval Wenck will not exceed the authorized We will provide the excel spreadsheet as a reference as a detailed cost breakdown.

Task	Task Description	Cost
1	Meetings	\$6,478
2	Data Organization	\$3,573
3	Surveying	\$35,148
4	Hydrologic analysis	\$16,666
5	Hydraulic Analysis – Detailed Areas	\$30,751
6	Hydraulic Analysis – Non-Detailed Areas	\$13,318
7	GIS work and Mapping	\$16,862
8	Reporting	\$15,320
Total		\$138,116

Schedule

The list below is a proposed schedule for key project deliverables and meetings.

- ▲ Kickoff meeting – **December 2017 or January 2018**
- ▲ Submittal of Hydrology to IAHR – **March 2018**
- ▲ Submittal of hydraulic models to MnDNR for review and comment – **July 2018**
- ▲ Submittal of revised hydraulic model – **October 2018**
- ▲ Draft floodplain shapefiles and depth grids to MnDNR – **February 2019**
- ▲ 60% Draft Narrative to MnDNR for review and Comment – **February 2019**

Rita Weaver

Floodplain Action Hydrologist

MnDNR

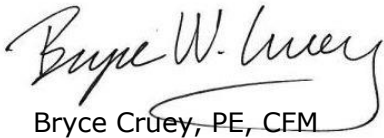
November 28, 2017

- ▲ 90% Draft Narrative to MnDNR for review and Comment – **April 2019**
- ▲ All final files to MnDNR staff – **June 2019**

We look forward to assisting you with this project. If you have any questions regarding the scope of services and cost proposal enclosed, please contact me at 763-252-6841 or Ed Matthiesen at 763-252-6851.

Sincerely,

Wenck Associates, Inc.



Bryce Cruey, PE, CFM
Project Manager, Associate



Ed Matthiesen, PE
Principal